

PREPAREDNESS REGARDING EMERGING FEED/FOOD RISKS DERIVING FROM CIRCULAR ECONOMY-DRIVEN REUSE OF FORMER WASTES IN FEED/FOOD PRODUCTION

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INTRODUCTION

The driving force behind the need to improve the overarching sustainability of the feed/food production chain is pushing a relevant pressure on the use of by-products (former wastes) from other non-feed/non-food chains. The potential association of raw material and process contaminants in the by-product as feed material could impact on animal welfare/health and food safety requirements of animal nutrition, including water. Several examples can be derived from the reuse of by-products that recognise different origin and provenance. Distiller's dried grains with soluble (DDGS) from biofuel streams in animal nutrition. Sludge-derived compost and digestate disposed of on arable land as topsoil improvers and reused water from Civil Wastewater Treatment Plants (WWTP) in agriculture. Algae biomass from environmental blooms. Former wastes may introduce to the feed/food chain emerging and re-emerging hazards that, alone or in combination, could represent a risk for food safety/security. This paper aims to design a holistic approach to guarantee the overall agriculture sustainability targets without compromising the food security and food safety aspects.

METHODOLOGY

The methodology is based on a risk orientation as the output of a rating scale approach. The rating scale aims to embed the following qualifying aspects on which the EU farm-to-fork concept and the Common Agriculture Policies rely: a) Animal health, welfare and feed/food security; b) Food safety & One Health (including antimicrobial resistance); c) Socioeconomic support to small and medium-sized farms and low-mileage food chains; d) Consumer accountability; e) Presence of cross-cutting legislative approaches, with particular attention to emerging hazards and the related end-of-waste criteria tailored to the specific end-use; f) Traceability of the process/product from which by-products are derived. The above-mentioned qualifying points of the proposed grid are based on the White Paper issued by the EU Commission in 2000 in response to the BSE and Dioxin crises, in which the overall traceability of the food chain from farm to fork was considered a priority.

RESULTS

In order of higher to lower risk ranking, the following by-products have been identified: 1) By-products from civil wastewater treatment plants: composts, digestate and reused waters. The presence of human-derived AMR factors has been reported, as well as human pharmaceuticals able to interfere with the drug residue monitoring plan in food and feed, as such compounds can be taken up by plant roots and enter animal nutrition, including via topsoil associated with grass and hay; 2) By-products from biofuel streams, which may acknowledge the use of vegetal biomasses that are not compliant for food/feed use. No traceability nor qualifying End of Waste (EoW) has been implemented; 3) Feed material from environmental biomasses, algae and various other aquatic plants may originate from phyco-remediation of urban and industrial effluents; 4) Food scraps from catering: their heterogeneous composition and the fermentation, with the production of thermostable mycotoxins, may hamper their reuse; 5) Leftovers from the food and feed industry: such wastes are currently assimilated with those from non-feed/non-food activities, despite the full traceability of origin and provenance.

DISCUSSION

Within the circular economy approach, the agriculture WIN-WIN in terms of sustainability and socioeconomic impact may produce bitter surprises if not fully supported by traceability of by-products and case-by-case tailored EoW criteria, according to an exhaustive characterisation of the hazards linked to the process/product and their impact on the different food chains in terms of sensitivity and vulnerability. In particular, the food safety/security risks associated with the reuse of biological materials from non-food/non-feed processes seem overlooked in the EEA legislation that defines EoW criteria focused mainly on environment and human health determinants. The availability of untargeted analyses for organic contaminants, and the full genome profiling of the former waste, would represent a tool to support both the environmental sustainability and the food safety/food security requirements of the short food chains linked to the territory. A delay in doing this would likely provoke a loss of accountability in terms of the Greenwashing and Junk Agroecology charges, because the claims of sustainability would not address the preparedness in preventing food crises.